

REMARKS

Applicant thanks the Examiner for carefully considering the present application. Please reconsider the present application in view of the above amendments and the following remarks.

Disposition of Claims

Claims 1-3 and 9-26 were pending in the present application. New claims 27-29 have been added. Thus, claims 1-3 and 9-29 are now pending in the present application. Claims 1-3 are independent claims. Claims 9-14 and 27 depend from claim 1, claims 15-20 and 28 depend from claim 2, and claims 21-26 and 29 depend from claim 3.

Amendments to the Claims

Claims 1-3 and 9-26 have been amended by way of this reply. Claims 1-3 and 9-26 have been amended to conform the claims to U.S. practice and to correct peculiar wording caused by translation of the claims. Claims 1-3 have further been amended to more precisely claim the present invention, and claims 9-26 have been further amended to keep the terminology consistent with the amended claims 1-3. Support for the amendments to claims 1-3 can be found, for example, in paragraph [0084]. New claims 27-29 have also been added. No new matter has been added by the amendments.

Objections to the Claims

Claims 1 and 3 are objected to for informalities. Specifically, the Examiner asserts that the claimed limitation "at least one preliminary optical fiber function as one of the incident side

optical fiber and the emitting side optical fiber” and “from the preliminary incident side optical fiber to one of the emitting side optical fibers” are misleading because neither the specification, nor the drawings, show the preliminary fiber as one of the incident fibers. The Applicant respectfully notes that paragraph [0088] of the published application and Fig. 9 explicitly discloses “a preliminary optical fiber 4b is arranged on the incident side.” Claims 9 and 15 are also objected to for informalities. Specifically, the Examiner asserts that the limitations “said driving means can escape the reflection means” is indefinite, because the driving means never detaches from the reflection means never detach from each other. The claims has been amended to clarify that the driving member is operable to actuate the movable reflection member out of an optical path between the incident side optical fiber and the emitting side optical fiber, which is accomplished, for example, by raising and lowering the reflection member 5 (*See* paragraph [0074] of the published application). Accordingly, withdrawal of this objection is respectfully requested.

Rejections Under 35 U.S.C. § 102

Claims 1-3, 9, 13, 15, 19, 21, and 25 of the present application were rejected under U.S.C. § 102 (e) as being anticipated by U.S. Patent No. 6,542,656 (“Hill”). The claims have been amended by way of this reply. To the extent that the rejection may apply to the amended claims, this rejection is respectfully traversed.

Claim 1, as amended, requires, in part, “reflection means comprising a single movable reflection member that is operable to transmit an optical signal between the preliminary optical fiber and each of the plurality of emitting side optical fibers or each of the plurality of incident side optical fibers by reflecting the optical signal.” Claim 2, as amended, requires, in part,

“reflection means comprising a single movable reflection member that is operable to reflect an optical signal from each of the plurality of incident side optical fibers to the single preliminary emitting side optical fiber.” Claim 3, as amended, requires, in part, “reflection means comprising a single movable reflection member that is operable to reflect an optical signal from the preliminary incident side optical fiber to each of the plurality of emitting side optical fibers.”

The optical switch of the claimed invention has a plurality of incident side optical fibers, a plurality of emitting side optical fibers, a preliminary optical fiber, a reflection means comprising a single movable reflection member, and a driving member. The driving member is operable to actuate the single movable reflection member to a plurality of positions such that the single movable reflection member can reflect an optical signal from the preliminary optical fiber to *each of the plurality* of emitting side optical fibers, or from *each of the plurality* of incident side optical fibers to the preliminary optical fiber. Thus, the claimed invention allows N to 1 switching using a single movable reflection member.

Hill discloses in Fig. 3A an add-drop optical switch with fixed reflectors and movable reflectors, such as movable mirrors 360, 370, wherein the movable mirrors 360, 370 are movably coupled on the substrate 310. The movable mirrors 360, 370 can switch the optical radiation coming from the IN optical path 320 between the OUT optical path 330 and the DROP optical path 350. However, contrary to the claimed invention, Fig. 3A fails to show or suggest a plurality of incident side optical fibers or a plurality of emitting side optical fibers. Instead, Fig. 3A shows a single incident side optical fiber 320, a single emitting side optical fiber 330, and two preliminary optical fibers 340, 350. Further, Fig. 3A of Hill discloses 1 to 1 switching. In other words, Fig. 3A of Hill discloses a movable mirror 360 that can reflect a signal from only one

incident side optical fiber 320 to the preliminary fiber 350, and another movable mirror 370 that can reflect a signal from the preliminary fiber 340 to only one emitting side optical fiber 330. Thus, Fig. 3A of Hill fails to show or suggest *a single movable reflection member* that can reflect an optical signal from the preliminary optical fiber to *each of a plurality* of emitting side optical fibers, or from *each of a plurality* of incident side optical fibers to the preliminary optical fiber, as required by the claims.

The only embodiment in Hill which discloses a plurality of incident side optical fibers and a plurality of emitting side optical fibers is Fig. 5. However, Fig. 5 of Hill discloses a plurality of 1 to 1 switching mechanisms, instead of the N to 1 switching of the claimed invention. That is, for each of the incident side optical fibers 520a, 520b, 520c, there is a corresponding movable mirror 560a, 560b, 560c and a corresponding preliminary fiber 550a, 550b, 550c, and for each of the emitting side optical fibers 530a, 530b, 530c, there is a corresponding movable mirror 570a, 570b, 570c, and a corresponding preliminary fiber 540a, 540b, 540c. In other words, each of the movable mirrors 560a, 560b, 560c can reflect a signal from only one corresponding incident side optical fiber 520a, 520b, 520c to the corresponding preliminary fiber 550a, 550b, 550c, and each of the movable mirrors 570a, 570b, 570c can reflect a signal from the corresponding preliminary fiber 540a, 540b, 540c to only one corresponding emitting side optical fiber 530a, 530b, 530c. Thus, Hill fails to show or suggest *a single movable reflection member* that can reflect an optical signal from the preliminary optical fiber to *each of a plurality* of emitting side optical fibers, or from *each of a plurality* of incident side optical fibers to the preliminary optical fiber, as required by the claims.

In view of the above, claims 1-3 are patentable over Hill, at least for the above reasons. Claims 9, 13, 15, 19, 21, and 25 are dependent from claims 1-3. Thus, claims 9, 13, 15,

19, 21, and 25 are patentable over Hill, for at least the same reasons as claims 1-3. Accordingly, withdrawal of this rejection is respectfully requested.

Rejections Under 35 U.S.C. § 103

Claims 10, 11, 14, 15, 17, 20, 22, 23, and 26 of the present application were rejected under U.S.C. § 103 (a) as being unpatentable over Hill in view of U.S. Patent Application Publication No. 2002/0196999 ("Kim"). The claims have been amended by way of this reply. To the extent that the rejection may apply to the amended claims, this rejection is respectfully traversed.

As explained above, claims 1-3 are patentable over Hill. Kim fails to provide that which Hill lacks with respect to these claims. Kim teaches spheres that can be selectively pivoted or rotated to align the input module with an output module. Kim teaches "push rods 90 that are positioned at equal intervals around the circumference of an annular flange 74. Each push rod 90 comprises a composite beam that is moved by a composite motor 92. The motors are supported by a pair of brackets 96, 98 that are mounted to a base 100 to which the faceplate 76 is also secured. Upon application of the driving signal to the composite motors 92, a force is created on the push rods 90 that cause the push rods 90 to press in varying degrees against the annular flange 74. Movement of the flange 74 causes the orientation of the sphere 72 within the conical section 78 of the faceplate 76 to be changed, thereby changing the orientation of the optical module 70 in the optical switch." Kim further discloses that stepper motors with lead screws can be used to gimbal the optical module in order to change the orientation of a sphere or other frame in which the module is placed. (See paragraphs [0027] and [0031] of Kim)

Contrary to the claimed invention, Kim does not show or suggest using a movable reflection member. In fact, Kim discloses that "conventional deflection-based optical switches often have high signal losses and require expensive packaging or costly labor-intensive alignment." Thus, Kim actually teaches away from such a feature. Because Kim fails to show or suggest using a movable reflection member, Kim also fails to show or suggest *a single movable reflection member* that can reflect an optical signal from the preliminary optical fiber to *each of a plurality* of emitting side optical fibers, or from *each of a plurality* of incident side optical fibers to the preliminary optical fiber, as required by the claims.

The Examiner asserts that Kim discloses the additional limitations of claims 10, 16, and 22, stating that Kim teaches "means for moving the movable reflective means is step motors." However, as explained above, Kim only teaches step motors that change the orientation of a sphere or other frame in which the module is placed, and not for actuating the movable reflection member to a plurality of positions, as in the claimed invention.

In view of the above, claims 1-3 are patentable over Hill and Kim, whether considered separately or in combination, for at least for the above reasons. Claims 10, 11, 14, 15, 17, 20, 22, 23, and 26 are dependent from claims 1-3. Thus, claims 10, 11, 14, 15, 17, 20, 22, 23, and 26 are patentable over Hill, for at least the same reasons as claims 1-3. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 12, 18, and 24 of the present application were rejected under U.S.C. § 103 (a) as being unpatentable over Hill in view of U.S. Patent No. 6,647,173 ("Chen"). The claims have

been amended by way of this reply. To the extent that the rejection may apply to the amended claims, this rejection is respectfully traversed.

As explained above, claims 1-3 are patentable over Hill. Chen fails to supply that which Hill lacks with respect to these claims. Chen teaches an optical switch having a mirror 21 that is moveable in an arc from a position out of an optical path to a position within the optical path from the two I/O ports 10, 50 to the prism 22. Chen fails to show or suggest a plurality of incident side optical fibers or a plurality of emitting side optical fibers, nor a single movable reflection member that can reflect an optical signal from the preliminary optical fiber to each of a plurality of emitting side optical fibers, or from each of a plurality of incident side optical fibers to the preliminary optical fiber, as required by the claims. Instead, Chen, like Hill, teaches 1 to 1 switching.

In view of the above, claims 1-3 are patentable over Hill and Chen, whether considered separately or in combination, at least for the above reasons. Claims 12, 18, and 24 are dependent from claims 1-3. Thus, claims 12, 18, and 24 are patentable over Hill, for at least the same reasons as claims 1-3. Accordingly, withdrawal of this rejection is respectfully requested.

New Claims

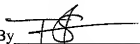
New claims 27-29 have been added by way of this reply. Support for claims 27-29 can be found, for example, in paragraphs [0084] and [0085] of the published application. Claim 27 is dependent from claim 1, claim 28 is dependent from claim 2, and claim 29 is dependent from claim 3. Thus, claims 27-29 are allowable, for at least the same reasons as claims 1-3.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account No. 50-0591, under Order No. 15115/153001 from which the undersigned is authorized to draw.

Dated: October 4, 2007

Respectfully submitted,

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